

REMARKS

In response to the outstanding Office Action of October 5, 2005, the undersigned notes with appreciation that the claims selected in the telephone restriction have been allowed.

RESTRICTION REQUIREMENT

Applicants confirm the telephonic election of Group 2, claims 14-23. The non-elected independent claim 1 is hereby cancelled. The elected (and aside from a rejection over commonly owned art allowable) independent claim 14 is a method claim that recites use of a polishing composition identical to the polishing composition recited in non-elected claim 1. The pending dependent claims 2-10 recited preferred variants of this polishing composition. Therefore, claims 2-10 are amended to depend from the elected method claim 14. Claims 11-13, which if so amended would be indistinguishable from elected original claims 18-20, are hereby cancelled.

Claim 14 recites the polishing composition optionally contains "a sufficient amount of an acid and/or a base to adjust the pH of the composition to a desired level." Newly added dependent claim 24 recites the pH of the composition is between 4 and 10 as described in paragraph [0099]. Newly added dependent claim 25 recites the pH of the composition is between about 5.2 and about 5.5, as shown in the examples in the Table following paragraph [0252] and as described in the text at paragraphs [0253] to [0255].

Newly added dependent claim 26 recites the allowed range of the hydroxylamine derivative is from about 0.2 to about 20%, as described in paragraph [0159], and that the allowed range of the acid and/or a base to adjust the pH of the composition is from about 0.01 to about 1%, as described in paragraph [0163].

Newly added independent claim 27 is identical to claim 14 except in the last clause where the recited barrier layer removal rate is between 200 and 580 angstroms per minute, as shown in paragraph [0253].

NON-STATUTORY DOUBLE PATENTING

The pending claims 14-23 stand rejected for non-statutory double patenting over two commonly-owned references, U.S. Patent 6,156,661 which claims an earliest priority date of June 21, 1993, and U.S. Patent 6,635,186 which claims an earliest priority date of July 26, 1996. The instant application claims priority through a string of applications back to the same July 26,

1996 date as is claimed in U.S. Patent 6,635,186. With respect to U.S. Patent 6,635,186, a Terminal Disclaimer is filed herewith to overcome this rejection.

With respect to U.S. Patent 6,156,661, however, Applicants respectfully traverse. Independent claim 14 recites the following clauses:

- 1) “providing a substantially abrasive-free chemical mechanical polishing composition ...;”
- 2) “contacting the chemical mechanical polishing composition with a substrate having a metal oxide layer surface, upon which metal oxide surface a barrier layer is disposed, upon which barrier layer a metal layer is disposed;”
- 3) “chemically mechanically polishing the substrate by contacting the substrate surface with an abrasive polishing pad at an applied pressure of not more than about 2 psi ...;” and
- 4) “wherein the removal rate of the barrier layer greater than about 500 Å/min, and wherein the removal rate of the metal oxide layer is less than about 10 Å/min.”

U.S. Patent 6,156,661 discloses in the abstract:

A composition for ... chemical mechanical polishing of a copper surface is an aqueous solution with a pH between about 3.5 and about 7 ... (that) contains a monofunctional, difunctional or trifunctional organic acid and a buffering amount of a ... hydroxylamine, hydroxylamine salt, hydrazine or hydrazine salt base. ... A method ... for chemical mechanical polishing of a copper surface comprises applying the above composition to the copper surface, and polishing the surface in the presence of the composition.

U.S. Patent 6,156,661 further states in column 6 at lines 20-23 that:

It has also been determined that the Post Clean Treatment solutions can be used to perform CMP planarization of copper metal films. This type of polishing relies on the oxidation of the metal surface and the subsequent abrasion of the oxide surface with an emulsion slurry.

In pending claim 14, clause (1) requires the polishing composition to be abrasiveless. U.S. Patent 6,156,661 describes a process where “the subsequent abrasion of the oxide surface (is done) with an emulsion slurry.” This use of the term “slurry” implies there is an abrasive present.

In pending claim 14, clause (3) requires polishing the substrate by contacting the substrate surface with an abrasive polishing pad. There is no mention of an abrasive polishing pad in U.S. Patent 6,156,661.

In pending claim 14, clause (3) requires contacting the substrate with the abrasive pad "at an applied pressure of not more than about 2 psi." This is advantageous because at higher pressure low k dielectrics and copper damascene structures (described generally in clause 2 of claim 14, and with more particularity in the specification at paragraphs [0056] to [0057]) delaminate at higher applied pressures. U.S. Patent 6,156,661 is absolutely silent about polishing pressure.

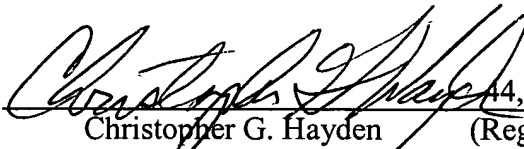
In pending claim 14, clause (2) recites there is a barrier layer, and clause 4 further recites the polishing composition must polish the barrier layer at a rate greater than 500 angstroms per minute. U.S. Patent 6,156,661 suggests those compositions are useful for copper, but it is absolutely silent about barrier layers and about the utility of those compositions for polishing barrier layers.

For at least each of the four reasons stated above, Applicants believe the rejection for non-statutory double patenting over U.S. Patent 6,156,661 should be reconsidered.

In light of the cancellations and additions of claims, no additional fees are believed to be due for this submission. However, should any fees be deemed necessary, please charge any required fees to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310. The Examiner is invited to call the undersigned attorney, if a telephone call could help resolve any remaining items.

Respectfully submitted,

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